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| 10/024,643      | 12/21/2001  | Yoshiharu Aruga      | Q67848              | 2776             |

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EXAMINER

MOUTTET, BLAISE L

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2853

DATE MAILED: 04/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/024,643

Applicant(s)

ARUGA ET AL.

Examiner

Blaise L. Mouttet

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 March 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-11 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Specification***

1. The amendment to the specification entered March 12, 2003 has overcome the objections contained in the prior office action.

### ***Claim Objections***

2. The amendment to the claims entered march 12, 2003 has overcome the minor claim objections contained in the prior office action.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Cook US 6,155,664.

Cook discloses, regarding claim 1, an ink jet recording apparatus comprising:

a recording head (24) mounted on a carriage, the recording head being reciprocally movable in a width direction of a recording sheet (column 5, lines 36-41);  
and

a sub-tank (4) for supplying ink to the recording head (24) from an ink cartridge (10), wherein the sub-tank (4) is mounted on the carriage with the recording head (24) (figure 1, column 5, lines 42-53), the sub-tank (4) comprising:

an ink level detector (30a, 30b), for detecting at least a low ink state in which quantity of ink stored in the sub-tank is smaller than a predetermined value, and a full ink state in which the quantity of ink stored in the sub-tank reaches the predetermined value (column 12, lines 8-21), and

an ink consumption counter (36), for acquiring the total quantity of ink ejected or discharged by the recording head (24) (column 11, line 65 - column 12, line 7),

wherein the ink level detector (30a, 30b) and the ink consumption counter (36) operate simultaneously (as disclosed in relation to the embodiment of figure 6 in which both sensing methods are performed simultaneously and compared to determine if the sensors are working properly), and

wherein, when the ink level detector (30a, 30b) detects the low ink state (figure 6, step 158, column 14, lines 38-44) and the value acquired by the ink consumption counter (36) reaches a predetermined count value (figure 6, step 164, column 15, lines 15-20), ink is supplied to the sub-tank (4) from the ink cartridge (10) (figure 6, step 178).

Regarding claim 3, ink supply valve (5) is disposed along ink supply path (6,7) extending from the ink cartridge (10) to the sub-tank (4) to supply ink when opened (column 5, lines 56-65).

Cook discloses, regarding claim 8, an ink supply method of controlling supply of ink to a sub-tank (4) of an ink jet recording apparatus which comprises a recording head

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(24) which is mounted on a carriage and is reciprocally moved across the width of a recording sheet (column 5, lines 36-41), the sub-tank (4) to which ink from an ink cartridge (10) is supplied and from which ink is supplied to a recording head (24) (column 5, lines 42-53), an ink level detector (30a, 30b) for detecting the quantity of ink retained in the sub-tank (4) (column 12, lines 8-21), and an ink consumption counter (36) for calculating as a count value, total quantity of ink ejected or discharged by the recording head (24) (column 11, line 65 - column 12, line 7), the method comprising the steps of:

detecting the quantity of ink stored in the sub-tank (4) by the ink level detector (30a, 30b) (figure 6, step 158, column 14, lines 38-44);

referring to the count value acquired by the ink consumption counter (36) and determining whether the referred value reaches a predetermined count value where a low ink state in which the quantity of ink stored in the sub-tank (4) is smaller than a predetermined value (figure 6, step 164, column 15, lines 15-20);

supplying ink from the ink cartridge (10) to the sub-tank (4) when the referred value reaches the predetermined count value (figure 6, step 178),

wherein, the detecting and referring steps are performed simultaneously (the reference to the count value is performed simultaneously to the detection in step 158 so that the ink levels determined by the two methods may be compared and used to determine the functionality of the sensor as explained in column 14, lines 38-59).

Regarding claim 9, the ink transfer from ink cartridge (10) to sub-tank (4) continues until the sub-tank is full (column 13, lines 36-55) and the transfer is disabled when the sub-tank is refilled (figure 6, step 192, column 16, lines 27-31).

Regarding claim 10, the count value of the sub-tank (4) is reset upon refill (figure 6, step 196, column 16, lines 39-44).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Kobayashi et al. EP 841 173.

Cook fails to disclose, regarding claim 2, that the predetermined count value used to determine maximum ink consumption in the ink sub-tank is obtained by taking into account the amount of ink consumed in a cleaning operation.

Cook fails to disclose, regarding claim 7, assigning coefficients and performing a multiplication process to determine ink consumption with the ink quantity counter.

Kobayashi et al. discloses that when performing ink consumption calculation using a drop counter the ink consumed during cleaning operations must be taken into account in order to attain a proper ink level value (page 2, line 38 - page 3, line 2, abstract) and providing a coefficient setting device (37) to assign coefficients to properly

determine the amount of ink consumed by performing a multiplication process (column 4, lines 48-54).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to set the predetermined count value used to determine maximum ink consumption in the ink sub-tank of Cook by taking into account the amount of ink consumed in a cleaning operation and assign coefficients and performing a multiplication process to determine ink consumption with the ink quantity counter as taught by Kobayashi et al.

The motivation for doing so would have been to more properly determine the amount of ink consumed by properly taking into account all sources of ink usage as suggested by page 3, lines 10-13 of Kobayashi et al.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Duffield et al. US 4,432,005.

Cook fails to disclose that the ink cartridge stores an ink pack composed of a flexible material in which the ink is enclosed, an outer block member of the ink cartridge is airtight, and air compressed by an air compressor is supplied to a space defined between the ink pack and the outer block member and ink from the ink cartridge is supplied to the sub-tank under the compressed air.

Duffield discloses an ink cartridge storing an ink pack (14a) composed of a flexible material in which ink is enclosed, an outer block member (18) of the ink cartridge is airtight, air compressed by an air compressor (22) is applied to a space

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defined between the ink pack (14a) and the outer block member (18) and ink from the ink cartridge is supplied to sub-tank (8) under the compressed air (figure 1, column 4, lines 60-68).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to utilize the flexible ink pack and compressor mechanism of Duffield in the apparatus of Cook.

The motivation for doing so would have been to establish fine control over ink pressure during the ink refilling operation as suggested by column 3, lines 48-66 of Duffield et al.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Dumery US 4,466,284.

Cook teaches utilizing that any one of a variety of ink level sensor types may be used (see column 12, lines 36-42).

Cook fails to disclose an ink level detector utilizing a float member, a permanent magnet attached to the float and a magnetoelectric element for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member.

Dumery discloses a liquid level detector utilizing a float member (57), a permanent magnet (50) attached to the float (57) and magnetoelectric elements (13) for outputting an electrical signal in response to magnetic force generated by the



permanent magnet according to a relative position of a float position of the float member (column 3, line 62 - column 4, line 7).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize the magnetic float type liquid level sensor as disclosed by Dumery as the ink level sensor of Cook.

The motivation for doing so would have been to achieve ink level detection with a high resolution, low cost liquid level detector as taught by column 1, lines 47-51 of Dumery.

7. Claims 6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cook US 6,155,664 in view of Tamura et al. EP 1 097 814.

(Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.)

Cook teaches utilizing that any one of a variety of ink level sensor types may be used (see column 12, lines 36-42).

Cook fails to disclose an ink level detector utilizing a float member, a permanent magnet attached to the float and a magnetoelectric element for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member wherein the magnetoelectric element is positioned on a side wall of the sub-tank and a recessed portion is formed in

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the side wall where the magnetoelectric element is positioned so as to reduce a distance between the direction of travel of the magnet with the magnetoelectric element.

Tamura et al. discloses an ink level detector utilizing a float member (70), a permanent magnet (71) attached to the float (70) and magnetoelectric elements (72, 73) for outputting an electrical signal in response to magnetic force generated by the permanent magnet according to a relative position of a float position of the float member wherein the magnetoelectric element is positioned on a side wall of an ink sub-tank and a recessed portion is formed in the side wall where the magnetoelectric element is positioned so as to reduce a distance between the direction of travel of the magnet with the magnetoelectric element (figure 9, page 6, lines 40-42).

It would have been obvious for a person of ordinary skill in the art at the time of the invention to utilize the magnetic float type ink level sensor as disclosed by Tamura et al. as the ink level sensor of Cook.

The motivation for doing so would have been to facilitate detection of a plurality of ink levels to assist in the refill operation as suggested by page 2, lines 36-41 of Tamura et al.

***Allowable Subject Matter***

8. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for the indication of the allowability of claim 5 is the inclusion therein, in combination as currently claimed, of the limitation of the ink level detector being capable of detecting an ink overflow state of the sub-tank, wherein when the overflow state is detected, an operation is performed for opening an ink supply valve and for releasing to the atmosphere the air compressed by the air compressor applied to the space defined between the flexible ink pack of the ink cartridge and the outer block member. This limitation is found in claims 5 and is neither disclosed nor taught by the prior art of record, alone or in combination.

The examiner recognizes that the allowable subject matter provides advantages to the art including, but not limited by, ease of prevention of inappropriate ink overfilling of the sub-tank mounted on the carriage from the ink cartridge.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Response to Arguments***

9. The applicant has amended the claims to include the new limitation that the ink level detector and ink consumption counter operate simultaneously. The examiner agrees that this limitation is not met by the prior rejection. However this new limitation

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has necessitated new searching and consideration of the prior art leading to the new rejections contained above.

### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Blaise Mouttet whose telephone number is (703) 305-3007. The examiner can normally be reached on Monday-Friday from 8:30 a.m. to 5:00 p.m.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John E. Barlow, Jr. Art Unit 2853, can be reached on (703) 308-3126. The fax phone number for the organization where this application or proceeding is assigned is (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Blaise Mouttet March 28, 2003

Bm 3/28/2003

A handwritten signature in black ink, appearing to read 'Huan Tran', with a long horizontal flourish extending to the right.

Huan Tran  
Primary Examiner